

Amendments to the Claims:

The listing of claims will replace all prior versions, and listings. Of claims in the applications:

Listing of Claims:

Claim 1(Currently amended) The method of ~~detecting~~defining gene expression patterns comprises utilizing selecting gene expression signatures extracted a number of genes from gene expression profiles.

Claim 2(Currently amended) The method defined in claim 1 and further extracting gene expression signature embedded in gene expression profiles.

Claim 3(Currently amended) The method defined in claim 1 and extracting the gene expression signature from the gene expression profiles comprisinges several hundreds to tens of thousands genes which are measured by means of cDNA microarray, high density oligonucleotide array, random optic fiber array, and other platforms

Claim 4(Currently amended)The method of extracting gene expression signature from gene expression profiles, according to claim 2,wherein the gene expression signature ~~from the gene expression profile~~ is associated with biological functions or biological status.

Claim 5(Currently amended) The method defined in claim 1 including ~~the steps of~~ changing the order of genes and ~~performing frequency domain~~ transforms upon reordered or unordered genes using transforming functions comprising, but not limited to wavelets.

Claim 6(Currently amended) An apparatus wherein gene expression patterns are identified by gene expression signatures derived from gene expression profiles is ~~processed to provide a plurality of gene expression pattern to permit maximal separation among gene expression pattern, said gene expression signature representing different biological functions.~~

Claim 7(Currently amended)The apparatus defined in claim 6 comprising devices for extracting gene expression signature from gene expression profiles at frequency domain to permit clustering of genes associated with permutations of biological function and status; and to provide reproducible classification for permutations, biological status and functional association of genes.

Claim 8 (Original) Apparatus defined in claim 6 including apparatus for processing gene expression profiles comprising a gene order library coupled to a gene order selection device; a gene expression profile input device;

an ordered gene profile processor ;
said gene order selection device and said gene expression profile input device both coupled to said gene expression profile processor;
an output device;
said ordered gene profile processor being coupled to said output device;
and a wavelet library and wavelet selection device being coupled through a frequency domain converter to said ordered profile processor.

Claim 9 (Original)The apparatus defined in claim 8 including an output device and an error examiner coupled to said output device, said error examiner being coupled through a storage device to said ordered profile processor.

Claim 10 (Currently amended) A method of extracting gene expression signature associated with biological functions or status from expression profiles based on a frequency domain transformation using wavelets comprises: forming an input gene expression profile as training and testing profiles; converting the gene expression profile into relative gene expression profile;
selecting a gene order;
converting the relative gene expression profile into an ordered relative gene expression profile;
selecting a wavelet function;
selecting a scale;
transforming the ordered relative gene expression profile with the selected wavelet and scale;
training a classifier by classification method, comprising MPL or Bayesian neural network, with the wavelet transformed gene expression profile;
forming an ordered relative gene expression profile with a set of validating data with the same scale and wavelet used to form the training and testing profiles;
calculating an estimated error with the trained classifiers;

Claim 11(Original) The method defined in claim 10 and further determining optimal orders of genes to permit formation of reproducible clusters and classification of genes and permutations of biological states represented by gene expression profiles.

Claim 12(Original)The method according to the claim 10 wherein an iterative procedure is utilized with different gene orders, wavelet functions and scales to determine the order of genes, the wavelet function and scale for the obtained classifier that demonstrates the lowest estimate error for classification of validating data set.

Claim 13(Original) The method defined in claim 12 and converting the ordered relative gene expression profile into frequency domain at different scale after rearranging the order of genes.

Claim 14(Currently amended) The method according to the method defined in claim 12 wherein a scale is selected for frequency domain transform of the gene expression profiles to permit association between ~~maximal separation among~~ gene expression

signatures and biological functions or status ~~representing different functions.~~

Claim 15(Original) The method defined in claim 12 wherein said wavelet function is selected from the selecting device including a keyboard and a computer program subroutine function.